

# PATENT SPECIFICATION



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## PROVISIONAL SPECIFICATION

### Improvements in or relating to Locking Devices, Nuts, Set-screws and the like.

We, JACK PERDUE, a British Subject, of "Perton," Park Road, Great Sankey, Nr. Warrington, Lancashire, and RUBY OWEN MESSIER LIMITED, a British Company, of Liverpool Road, Warrington, Lancashire, do hereby declare the nature of this invention to be as follows:—

This invention comprises improvements in or relating to locking devices, nuts, set-screws and the like.

It is an object of the invention to provide a locking device which will effectively secure a nut or set-screw or the like at any one of a considerable number of positions of adjustment or tightness, which is secure when locked and which is readily released when so desired.

According to the present invention a nut, set-screw or like screwed member which is to be locked is provided with a washer which is integral with or immovably secured to it and which is peripherally notched in combination with a locking spring which is mounted upon the part to which the nut, set-screw or the like is screwed, is adapted to enter the notched washer and lock the same and is provided with an abutment which stands up above the surface of the said washer so as to engage a spanner when the same is applied to the nut, set-screw or the like and is pushed aside thereby out of locking engagement with the washer. By this means, when the parts are being tightened in position or adjusted by the aid of a spanner, the locking means is kept out of operation, but automatically falls into a notch of the washer as soon as the spanner is removed.

Conveniently the washer is notched at close intervals around the whole of its periphery.

The following is a description by way of example of one construction in accordance with the invention as applied to a device for locking in place an inflation cap on a shock absorber for a part of an aircraft undercarriage.

The cylinder of the shock absorber, which is of the oleo-pneumatic type, is provided with an inflation fitting closed by a screwed cap. The inflation fitting ex-

tends transversely across the shock absorber cylinder and is provided at the opposite end from the screwed inflation cap with a concentric projection which passes through the opposite wall of the shock absorber cylinder from that which receives the inflation fitting. The cylinder is grooved circumferentially around its outer surface in the plane which contains the axis of the inflation fitting and in the groove there is situated a spring wire clip which passes through the aforesaid projection on the end of the fitting, a hole being drilled to receive it. One end of the wire clip is bent up to form a locking wire close to the head of the inflation cap. The inflation cap is provided with a hexagon head and a washer integral with the head and of a somewhat greater diameter than the inflation fitting. The periphery of the washer is notched around its edge, the notches being wide enough to receive the locking wire on the clip aforesaid. There may be, for example, sixteen notches around the periphery of the washer.

The locking wire extends a little above the surface of the washer and is bent outwardly at its end. This portion constitutes an abutment to engage any spanner which may be applied to the inflation cap. Ordinarily a box spanner is used. When the spanner is applied to the cap it engages the abutment constituted by the end of the locking wire and pushes the wire radially outwards out of engagement with the notched washer so that the cap is no longer locked thereby. The cap may be screwed up or unscrewed therefore while the spanner is in place upon it without interference by the locking wire, but as soon as the spanner is removed the wire will drop into the nearest of the notches in the washer and hold the cap from movement. The fact that the locking spring passes through the projection on the inflation fitting where this passes through the back of the shock absorber leg ensures that the wire clip cannot become accidentally displaced and also that the inflation fitting itself is locked firmly against removal.

Dated this 3rd day of March, 1941.

BOULT, WADE & TENNANT,  
111 & 112, Hatton Garden,  
London, E.C.1.  
Chartered Patent Agents.

# COMPLETE SPECIFICATION

## Improvements in or relating to Locking Devices, Nuts, Set-screws and the like

We, JACK PERDIE, a British Subject, of "Perton," Park Road, Great Sankey, Near Warrington, Lancashire, and RUBY OWEN MESSIER LIMITED, a British Company, of Liverpool Road, Warrington, Lancashire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention comprises improvements in or relating to locking devices, nuts, set-screws and the like.

It is an object of the invention to provide a locking device which will effectively secure a nut or set-screw or the like at any one of a considerable number of positions of adjustment or tightness, which is secure when locked and which is readily released when so desired.

According to the present invention a nut, set-screw or like, screwed member which is to be locked is provided with a washer which is integral with or immovably secured to it and which is peripherally notched in combination with a locking spring which is mounted upon the part to which the nut, set-screw or the like is screwed, is adapted to enter the notched washer and lock the same and is provided with an abutment which stands up above the surface of the said washer so as to be engaged by a spanner when the same is applied to the nut, set-screw or the like and be pushed aside thereby out of locking engagement with the washer. By this means, when the parts are being tightened in position or adjusted by the aid of a spanner, the locking means is kept out of operation, but automatically falls into a notch of the washer as soon as the spanner is removed.

Conveniently the washer is notched at close intervals around the whole of its periphery.

We are aware of prior British Patent Specifications Nos. 23060/00, 2777/09 and 382,069. In the two former notches in nuts or in washers integral therewith are provided which are capable of receiving locking members bent up from an underlying part but in these cases there was no suggestion of the locking elements being con-

stituted by spring members so formed as to be automatically disengaged by a spanner applied to the parts. British Specification No. 382,069 shows in Figure 2 of the specification, as open to inspection under Section 91 of the Acts, a pipe and hose coupling having a spring locking device to enter notches around a screwed member of a co-operating part of the coupling, but here again there was no suggestion of automatic disengagement by means of a spanner and such automatic disengagement would be precluded by the shape of the parts in the prior specifications.

The following is a description by way of example of one construction in accordance with the invention as applied to a device for locking in place an inflation cap on a shock-absorber for a part of an aircraft undercarriage.

Figure 1 is a cross-section through the cylinder of a shock-absorber showing the inflation cap and locking device therefor in place.

Figure 2 is a side elevation of the same.

The cylinder 11 of the shock-absorber, which is of the oleo-pneumatic type, is provided with an inflation fitting 12 closed by a screwed cap 13. The inflation fitting 12 extends transversely across the shock-absorber cylinder and is provided at the opposite end from the screwed inflation cap with a concentric projection 14 which passes through the opposite wall of the shock-absorber cylinder 11 from that which receives the inflation fitting. The cylinder 11 is grooved circumferentially around its outer surface in the plane which contains the axis of the inflation fitting 12 as shown at 15 and in the groove there is situated a spring wire clip 16 which passes through the aforesaid projection 14 on the end of the fitting, a hole being drilled to receive it. One end of the wire clip is bent up to form a locking wire 17 close to the head 18 of the inflation cap. The inflation cap is provided with a hexagon head 18 and a washer 19 integral with the head and of a somewhat greater diameter than the inflation fitting 12. The periphery of the washer is notched around its edge, the notches 20 being wide enough to receive the locking wire 17 on

the clip aforesaid. There may be, for example, sixteen notches around the periphery of the washer 19.

6 The locking wire extends a little above the surface of the washer and is bent outwardly at its end as shown at 21. This portion 21 constitutes an abutment to engage any spanner which may be applied to the inflation cap. Ordinarily a box spanner is used and is indicated in the drawing at 22. When the spanner 22 is applied to the cap 18 it engages the abutment 21 constituted by the end of the locking wire as shown in chain lines in the figure, and pushes the wire radially outwards out of engagement with the notched washer 19 so that the cap is no longer locked thereby. The cap may be screwed or unscrewed therefore while the spanner is in place upon it without interference by the locking wire, but as soon as the spanner is removed the wire will drop into the nearest of the notches in the washer and hold the cap from movement.

25 The fact that the locking spring 16 passes through the projection 14 on the inflation fitting where this passes through the back of the shock-absorber leg 11 ensures that the wire clip cannot become accidentally displaced and also that the inflation fitting itself is locked firmly against removal.

35 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

40 1. A locking device comprising a nut, set-screw or like screwed member which is to be locked wherein said member is provided with a washer which is integral with or immovably secured to it and which is peripherally notched in combina-

tion with a locking spring which is mounted upon the part to which the nut, set-screw or the like is screwed, is adapted to enter the notched washer and lock the same and is provided with an abutment which stands up above the surface of the said washer so as to be engaged by a spanner when the same is applied to the nut, set-screw or the like and be pushed aside thereby out of locking engagement with the washer.

2. A locking device as claimed in claim 1, wherein the washer is notched at close intervals around the whole of its periphery.

3. A locking device as claimed in claim 1 or claim 2, applied to a screwed member on the side of a cylindrical element, wherein the locking spring consists of a wire ring which embraces the cylindrical element.

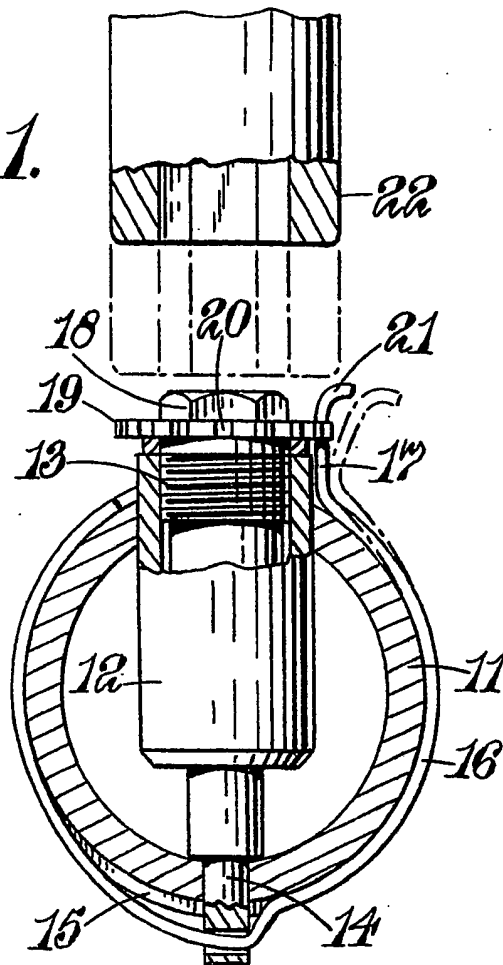
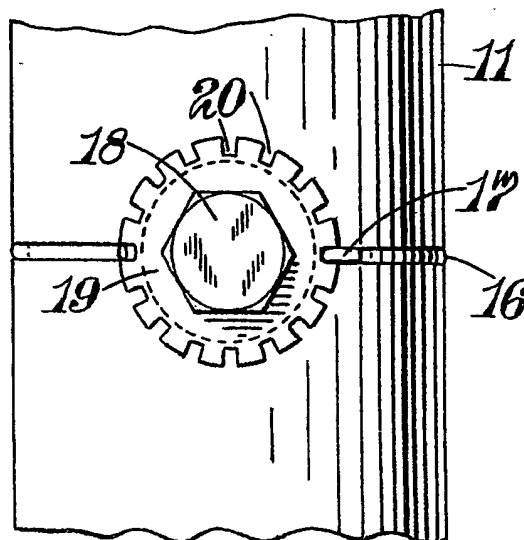
4. A locking device as claimed in claim 3, wherein the wire ring is held in place by being received in a groove in the surface of the cylindrical element.

5. A locking device for the inflation cap of an aircraft shock-absorber wherein the inflation cap is located in a fitting which extends transversely across the shock-absorber and is closed by a screwed member provided with a notched washer and locked by a locking spring, the washer and locking spring having the characteristics set forth in any one of the preceding claims.

6. A locking device for an inflation cap of an aircraft shock-absorber substantially as described with reference to and as shown in the accompanying drawing.

Dated this 13th day of November, 1941.

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*Fig. 1.**Fig. 2.*

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